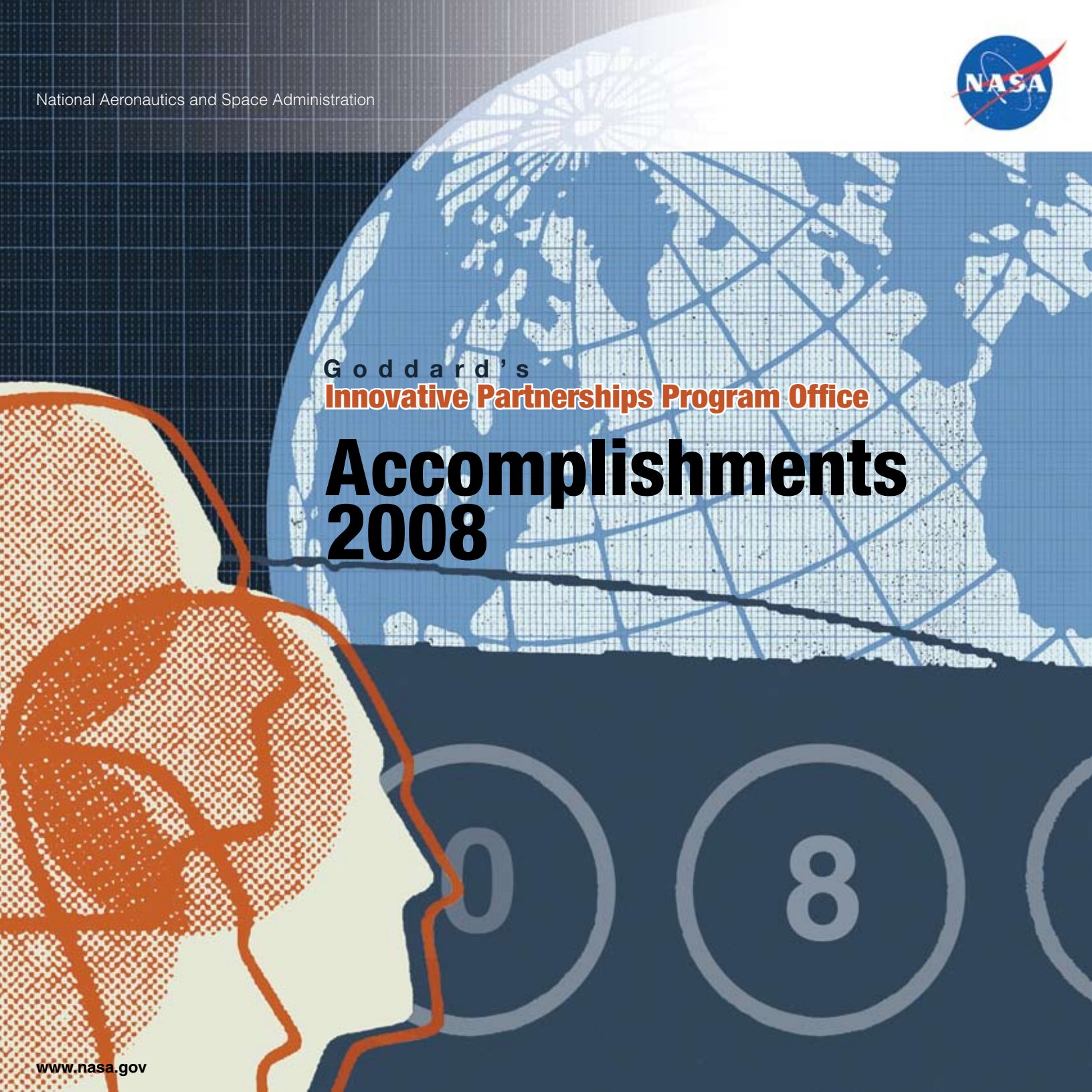
National Aeronautics and Space Administration



Goddard's

## Innovative Partnerships Program Office

# Accomplishments 2008

www.nasa.gov

# *Expanding. Excelling. Achieving.*

*Expanding our contacts. Excelling at new business practices. Achieving complex goals.*

*Nona Cheeks*

Thank you for picking up the *2008 Accomplishments Report,* highlighting the major successes and achievements of the Innovative Partnerships Program (IPP) Office at NASA Goddard Space Flight Center (GSFC). Tasked with championing innovation, our office is not one to do things the same way for long—and 2008 brought with it some positive shifts in the way we bring technology into NASA as well as the way we transfer technology out. These changes are helping us support NASA missions and, as always, make better use of taxpayer dollars by extending the use of NASA technology to applications here on Earth.

In 2008, we focused on ***expanding our network of contacts "beyond the usual suspects."*** In other words, we're looking further than the most obvious partnerships and networking opportunities. Our time-honored relationships are still nurtured, to be sure. But we're also looking into forging new bonds with organizations that can help us turn the next corner in meeting mutual NASA and industry goals. For example, we signed an exclusive license agreement this year with Ocean Tomo, an innovative company that auctions intellectual property (IP) to industry. This and other new agreements, as well as exposure at special events and symposia, are helping us reach out to a whole new network of innovative ideas and organizations.

Along with expanding our network, there comes a push toward ***excelling at new business practices.*** The Ocean Tomo agreement represents an entirely new way of doing business—a first for Federal agencies. In addition, an exciting partnership with Northrop Grumman's Electronics Systems division promises to impact the Maryland region as well as the country as a whole through advanced microwave sensing technologies.

Finally, the new connections and practices we've aimed for in 2008 are leading us toward ***achieving complex goals.*** We've seen steady, large increases in the number of Inventions and Contributions Board Awards received by GSFC innovators as well as an upward trend in the number of new technologies reported. We're also helping to meet the needs of NASA missions and growing businesses through SBIR/STTR contracts.

I hope you enjoy reading more about these and other 2008 GSFC accomplishments.

Nona Minnifield Cheeks
Chief
Innovative Partnerships Program Office
NASA Goddard Space Flight Center

*The IPP Office works together and with you to help put new ways of doing business into practice.*

The IPP Office was honored to be invited to speak to many national and international organizations in 2008, helping the office expand its reach with other NASA Centers, across the U.S. and abroad.

- U.S. Patent and Trademark Office
- Korean Foundation for International Cooperation of Science and Technology
- Einstein Forum
- Kennedy Space Center Open Innovation
- NASA's Project Management Challenge
- The Clinton Foundation Technology Exchange

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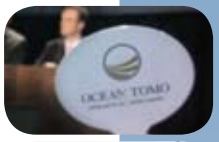
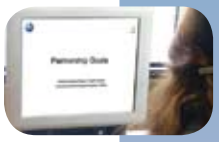




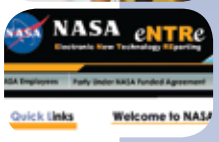







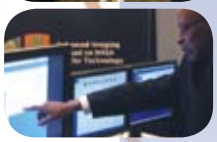















# IPP Program Elements

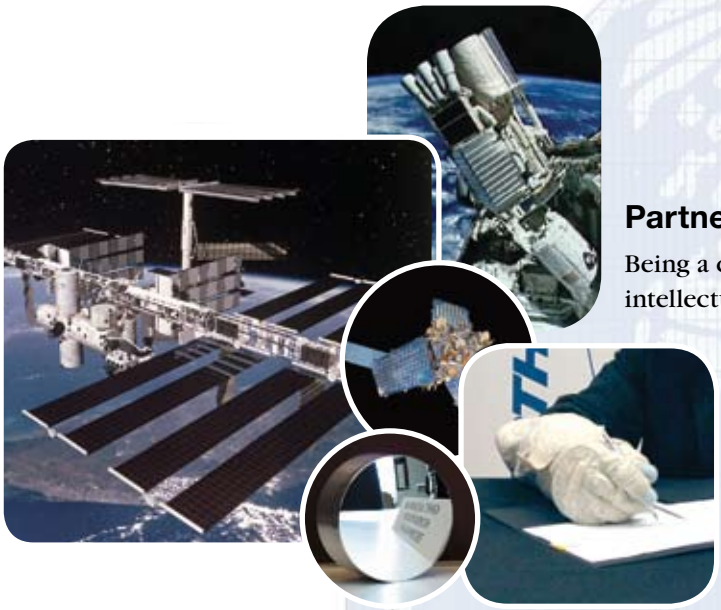


## Technology Infusion

The GSFC IPP Office is actively engaged in technology infusion—finding innovative solutions to NASA mission needs. The Small Business Innovative Research and Small Business Technology Transfer (SBIR/STTR) Program at NASA is managed by the IPP Office and works closely with missions to ensure alignment with current needs. IPP's Seed Fund Program has been a highly successful program, especially at GSFC, bringing a significant amount of leveraged R&D funding to develop solutions for NASA mission needs.

## Innovation Incubator

Stimulating innovation through a variety of mechanisms is a hallmark of the IPP Office. Offering contests and reaching out to form new business models are key components to IPP's Innovation Incubator. At GSFC, the IPP has blazed new trails for NASA, as well as other government agencies in seeking new relationships, such as its agreement with Ocean Tomo.

## Partnership Development

Being a catalyst is core to the IPP. Through managing NASA intellectual property strategically, securing collaborative arrangements with partners to provide mutually beneficial endpoints, and developing and securing new types of partnerships; IPP is the entry point for collaboration with NASA. GSFC's IPP strives to bring high value and strategic partners to Goddard. These activities enhance the resources available to NASA, in terms of funding and expertise.

# Championing Innovative Business Practices

GSFC's IPP Office is excelling at new business practices by extending our partnership reach beyond traditional agreements. Key recent agreements are showcasing new ways of licensing GSFC technologies, as well as collaborative innovation to benefit NASA missions. These agreements support economic growth as well as new applications that will benefit future generations.

## GSFC and Ocean Tomo Establish Groundbreaking Partnership to Commercialize NASA Technologies

In September, Ocean Tomo, LLC and GSFC announced a licensing agreement whereby GSFC would participate in the company's October 30th Live IP Auction in Chicago. Licensing government-owned patents through a live-auction process is a highly novel approach to partnering, and GSFC's participation in Ocean Tomo's auction was the first time a Federal laboratory participated in such an event.

*L to R: Darryl Mitchell (GSFC), Jim Malackowski (OT), Dean Becker (OT), Nona Minnifield Cheeks (GSFC), Connie Chang (OT), Andy Ramer (OT), Bryan Geurts (GSFC), and Stephen Holzen (OT).*

"The Innovative Partnerships Program Office at GSFC is charged with helping identify novel arrangements, like this one with Ocean Tomo, to bring technologies to the marketplace quickly," said Nona Cheeks, chief of GSFC's IPP Office. "This is a perfect example of how we are working to find innovative partnering opportunities that expand the utilization of NASA technologies in the public sector."

The unique partnership between GSFC and Ocean Tomo focuses on maximizing the value of GSFC's inventions by transferring technologies to commercialization partners, ultimately benefiting U.S. taxpayers and the domestic economy.

"We are truly honored to partner with NASA—a wellspring of technological ingenuity and creativity," said Dean Becker, Ocean Tomo's Vice Chairman. "Given the agency's world-class reputation and historic technological achievements, it is not surprising that we have already received a significant number of inquiries and considerable interest [in the NASA technologies for auction]."

> "We are truly honored to partner with NASA—a wellspring of technological ingenuity and creativity."
>
> *— Dean Becker*
> *Vice Chairman,*
> *Ocean Tomo*

The GSFC technologies offered at the October auction included:

- Hilbert-Huang Transform and applications: HHT is a highly efficient, adaptive, and user-friendly set of signal-processing algorithms, capable of analyzing time-varying processes. Designed specifically for nonlinear and nonstationary signals, HHT can be used to analyze data in a wide variety of applications including controls and automation, seismic exploration, reservoir imaging, geographical development, and industrial manufacturing.
- GPS-based system technologies and applications: These technologies provide autonomous, real-time, fully spaceflight-qualified GPS receivers with exceptional capabilities for fast signal acquisition and weak signal tracking, making them applicable to the fields of surveying, navigation, machine guidance, wireless platforms, telecommunication infrastructure, and homeland security.
- Capaciflector sensor technology and applications: This technology offers capacity-sensing elements that can be used as a single unit or a closely packed array. It eliminates sensor-mounting standoff, exhibits no thermal drift problems, and provides crosstalk-free performance. This technology can be used to detect mass and motion, enabling use for industrial process controls such as counting and capacity monitoring, as well as safety, security, and process monitoring such as object and human detection.



*GSFC's participation in Ocean Tomo's auction was the first time a Federal laboratory participated in such an event.*

*Gaming may be a key technology in training middle school through higher education students to solve the challenges of the future through highly innovative, collaborative environments.*

## GSFC Extends its Reach into the Future—Through Online Gaming

A new Space Act Agreement (SAA) managed by the IPP Office is providing another example of how GSFC is moving away from business as usual—and extending its reach far into the future.

The Massively Multi-Player Online (MMO) Learning Game platform is an Agency-wide initiative, managed at GSFC and administered by the Learning Technologies Project Office (LTPO). The project is designed to increase student interest, from middle school upwards, in and pursuit of science, technology, engineering, and mathematics (STEM). The IPP Office facilitated development of an SAA to initiate development of the MMO in 2008.

### *Why is NASA playing games?*

Simply put, research indicates that games are not only fun and engaging—they are good for the brain. Medical and cognitive studies have shown that the human brain can be induced to create new neural pathways through simulated environments, such as gaming. With MMO, NASA hopes to be able to enhance learning through use of "immersive synthetic environments" (ISEs) such as online games. Like suspending disbelief to enjoy the plot of a movie, users can choose to immerse themselves in a virtual world and, through that environment, train their brain by doing activities they may not be able to do in real life.

To date, most applications of ISEs have been for entertainment purposes. But NASA researchers and others believe that the same qualities and features that make ISEs such compelling entertainment also hold tremendous potential for education and collaborative work.

"We are currently preparing students for jobs that don't yet exist, using technologies that haven't been invented, in order to solve problems we don't even know are problems yet," noted NASA LTPO's Dr. Daniel Laughlin in a presentation about the new initiative. Those working on the agreement, like Dr. Laughlin, believe online gaming will be a key technology in training middle school through higher education students to solve the challenges of the future through highly immersive, collaborative environments.

Indeed, the online gaming market is ripe to support NASA's MMO initiative. If the popular multi-player games World of Warcraft and Second Life—which together represent a $19.5 million market—are any indication, NASA may be jumping on board a mega-trend.

### *Getting gaming companies online—and on board*

A new SAA to be managed by the IPP Office is at the heart of getting the MMO initiative going. In an early attempt to gain interest among gaming companies and to vet potential partners, NASA sponsored an MMO Workshop in April. The event provided potential partners an opportunity to learn directly from NASA officials about the vision, goals, and expectations for the development of the educational game. The workshop was attended by more than 120 participants from large corporations and small gaming companies, as well as from universities at home and abroad.

The IPP Office is currently in the process of reviewing a number of proposals, resulting from the workshop and the RFP. A partner is expected to be announced in early FY09.

*Technology Transfer Manager Darryl Mitchell leads the MMO initiative for the IPP Office.*

> "We are currently preparing students for jobs that don't yet exist, using technologies that haven't been invented, in order to solve problems we don't even know are problems yet."
>
> *— Dr. Daniel Laughlin*
> *Project Manager,*
> *NASA LTPO*

*The partnership with Northrop Grumman promises a positive impact on Maryland (both GSFC and the company's Electronics Systems division are located in the State), as well as the country as a whole, through better understanding of planet characteristics and climate change here at home.*

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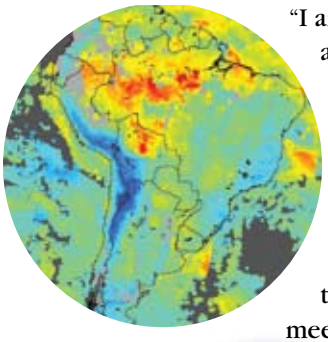
## New Agreement with Northrop Grumman Aims to "Measure the Immeasurable"

In 2008, the IPP Office continued to develop relationships with partners that will yield groundbreaking collaborative research and technology to directly benefit NASA missions. A new SAA with Northrop Grumman (NG) is a prime example of these efforts. Through the agreement, researchers from GSFC and NG are collaborating on the development of advanced civil radar system architectures that can be leveraged into new space-based remote sensing instruments with revolutionary performance characteristics. These systems will help scientists measure with far greater accuracy, precision, and detail such things as three-dimensional (3D) characteristics of Mars and other planets, as well as cloud composition and other characteristics on Earth, to better understand climate change.


*Goddard's Laurie Leshin and Northrop Grumman's Joe Ensor sign a new Space Act Agreement at Maryland Space Day.*



"I am confident that this agreement will be a catalyst for developing remote sensing systems that will allow us to measure things inaccessible to us now," said Cathy Long, Deputy Director of GSFC's Instrument Systems and Technology Division and technical point of contact for the agreement. "We're aligning our branch to create technologies and systems that will meet the needs of NASA missions and scientists for the next 20 years."

### *Benefits of the Agreement for NASA—and Beyond*

- A new class of planetary measurements will enable scientists to better understand the history and habitability of Mars and other planets.
- Remote sensing of environmental change from space will have huge implications for Earth science and our understanding of global warming and the carbon cycle.
- The partnership will enable NASA to conduct more exploration with less of its own investment.
- Significant expansion of its instrument development programs will give NASA new hardware capabilities.
- Northrop Grumman will be able to leverage its mature radar technology developed for Department of Defense applications into a valuable scientific tool that will benefit emerging science needs.



"This is a strategic partnership that blends the best of GSFC's and Northrop Grumman's advanced sensing capabilities. Our goal is to expand NASA's instrument technologies, while advancing new and innovative space-based mission concepts capable of making critical science observations in support of NASA goals."

*— Dr. Laurie Leshin*
*Deputy Center Director of*
*Science and Technology, GSFC*

**Many other agreements signed in FY08 are helping to extend the reach of GSFC technologies outside NASA while benefiting NASA missions in the near and long term.**

A new SAA with ***Genesis Engineering Solutions, Inc.*** may ultimately help NASA researchers address contamination issues that are critical to the success of optical instruments supporting NASA missions. As part of the agreement, GSFC will test samples of the company's dry laser cleaning process, using its state-of-the-art infrared laboratory located in the Optics Branch. Surface morphology and transmittance/reflectance response measurements will be provided to Genesis and also will be of use to NASA, providing additional data for its ongoing, cutting-edge research in dry-cleaning technologies that may be used on mission-critical optics instruments. GSFC also will receive reimbursement revenue as part of the agreement.

Providing critical characterization and measurements are also the subjects of an SAA with ***Advanced Powder Solutions***. NASA will provide optomechanical characterization and fabrication testing of materials to help further technology maturation for possible use in space-based applications, for missions including the International X-ray Observatory (IXO), formerly known as Constellation-X.

*An SAA with **ITT Space Industries** will save NASA tens of millions of dollars and ultimately shorten mirror fabrication time from 2 years to about 8 weeks.*

*The International Space Station and other missions will benefit from an SAA with **Space Exploration Technologies Corporation**, enabling NASA to validate and verify critical software provided by the company.*

NASA mission needs also are being anticipated through a partnership with ***Iridium Satellite Corporation***, which will collaborate with GSFC to establish application needs and requirements for increasing the data rates available to suborbital missions and to provide the Telemetry, Tracking, and Control (TT&C) function to NASA's low Earth orbiting (LEO) satellites via Iridium's NEXT—the company's next-generation constellation satellite program to be launched beginning in 2013. Through the agreement, NASA will be able to influence NEXT system capabilities to meet NASA mission needs. Researchers expect that the lower costs and continuous access will enable many more small experiments as well as two-way emergency communication services or contingency voice services for manned exploration missions.

An overall effort to integrate new components onto GSFC's Mission Services Evolution Center (GMSEC) bus includes a new SAA with ***a.i. Solutions***. The agreement will enable integration of the GSFC Trajectory Determination System (among other components) onto GMSEC, helping reduce the cost of ground-based aerospace mission operations.

Cost savings will also result from an SAA with ***Aerius Photonics***, which will enable development of new, in-house bump-bonding techniques, using detector arrays and multiplexers provided by the company. Such technology will give NASA new experience and capabilities without incurring in-house procurement or building costs.

*An SAA with the **Bureau of Indian Education** will contribute to NASA's goals of attracting and retaining students in science, technology, engineering, and math by supporting the educational needs of Native American Indian and Alaskan Native populations in science and technology.*

Many NASA missions, particularly ground- and space-based satellites, will benefit from an SAA with ***Princeton Plasma Physics Lab (PPL)***. The agreement will enable PPL to build a high-accuracy wavelength calibration spectrometer, for NASA's and its own use. Similarly, an SAA with ***Science Research Labs*** will provide NASA with a collaboratively developed, optically read thermal imager for use in future missions.

An SAA with ***QmagiQ*** will enable the company to build 10 high quality Gallium Arsenide Quantum Well Infrared Photodetector (QWIP) arrays. The arrays are planned for use on future NASA scientific instruments, and are expected to provide state-of-the-art performance in far infrared imaging.

## Agreements signed in FY08 are helping NASA

- Improve mission-critical instruments
- Further technology maturation
- Increase accuracy and speed of data transmissions
- Lower material and operational costs
- Conduct more scientific experiments
- Upgrade legacy systems
- Strengthen the science and technology workforce of the future



***Microcosm** has signed an SAA with GSFC, enabling exploration of ultra-lightweight mirrors, off-axis telescope design, advanced controls, and nano-materials. The agreement will benefit NASA's science and exploration missions through access to new and improved space telescope architectures.*

# Providing Strategic Guidance

The IPP Office is committed to providing guidance and support to both GSFC innovators and management, in an effort to more fully engage those directly connected with technology in the full partnering process. FY08 provided several successes in this area, with technologists and management playing active roles in technology transfer and infusion to expand GSFC's partnering prospects and the reach of its innovative influence.

*Case in Point:* **Dr. Stephanie Getty receives ongoing GSFC strategic support**

*Dr. Stephanie Getty*

Winner of the 2008 James Kerley Award for excellence in technology transfer, Dr. Stephanie Getty has fully embraced a relationship with the IPP Office. This relationship has provided ongoing strategic support to Dr. Getty to help her gain exposure for her cutting-edge nanotechnologies. In accepting her award, Dr. Getty commented on the importance of attending external events with support from the IPP Office. "I am grateful to the IPP Office for giving me the opportunity to participate in a wide variety of meetings, technology transfer forums, conferences, and workshops." Getty said the opportunities gave her insights into commercial opportunities for the technology areas in which she works.

The IPP Office supported Dr. Getty's attendance at several events in FY08, notably the MIT Enterprise Forum, the NYC Technology Exchange with Columbia University and

the Clinton Foundation, and the 2007 National Nano Engineering Conference. At the MITEF Technology Transfer Lab, Dr. Getty was one of only six presenting innovators. Her patent-pending NanoCompass technology—a lightweight, low-power magnetometer based on a Single Walled Carbon Nanotube (SWCNT) network—was well received by the panel of experts who provided Getty with feedback related to cost-competitiveness, finding approachable markets, and narrowing applications.

At the NYC Technology Exchange meeting, Dr. Getty shared insights into GSFC's instrument R&D. This included a presentation of GSFC capabilities and some challenges it is facing as the Center supports various Science and Exploration Mission Directorate Programs. Her participation assisted efforts to structure collaborative agreements with other parties who participated in the event.

*GSFC Deputy Director Rick Obenschain (right) presents Dr. Getty with the prestigious Kerley Award.*

In supporting Dr. Getty at these events, the IPP Office assisted in the development of presentations and other materials and, following the events, served as a liaison in Dr. Getty's interaction with external parties.

"I've been lucky to have a close relationship with the IPP Office in the time I've been at Goddard," said Dr. Getty. "Through this relationship, the IPP Office has encouraged me to protect my new technologies through the eNTRe system, they work to introduce me to potential industrial partners, and they keep me informed about upcoming funding opportunities… It's important [for innovators] to take full advantage of the resources available to you in the IPP Office. Make sure they know about your innovations. They are great at identifying partnership and funding opportunities that you might not otherwise come across."

> "I am grateful to the IPP Office for giving me the opportunity to participate in a wide variety of meetings, technology transfer forums, conferences, and workshops."
>
> *– Dr. Stephanie Getty*
> *Innovator,*
> *GSFC*

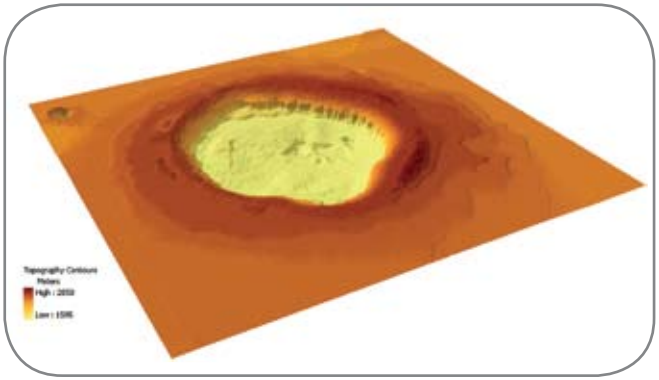
## Structuring Technology-Development Partnerships to Address Mission Needs

The value of the IPP Office's strategic guidance to GSFC innovators was dramatically illustrated in 2008 as several Constellation projects selected a GSFC technology for critical data consolidation and analysis functions.

*Since 2006, the IPP Office has provided strategic guidance to the ILIADS team, helping secure internal R&D funding and support from NASA HQ.*

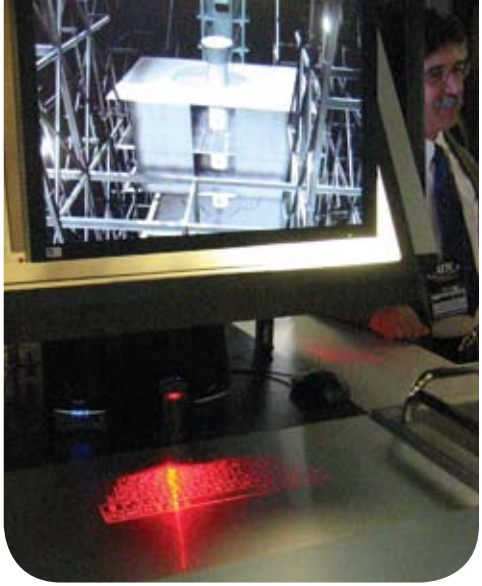
ILIADS—short for Integrated Lunar Information Architecture for Decision Support—was designed to give users easy access to a wide range of lunar data. Similar to terrestrial geographic information systems (GIS) software, ILIADS is a powerful tool for integrating and superposing very large, layered lunar science data sets. In addition to historic data, ILIADS will draw upon new data sets provided by recently launched international lunar missions as well as NASA's own Lunar Reconnaissance Orbiter (LRO) mission, scheduled to launch in spring 2009.

ILIADS can use these diverse yet complementary data sets—three-dimensional crater scenes, topographic contour maps, surface distance and elevation measurements, in situ resource and hazard maps, and much more—to conduct the analyses and visualizations needed for future crewed and robotic lunar missions.



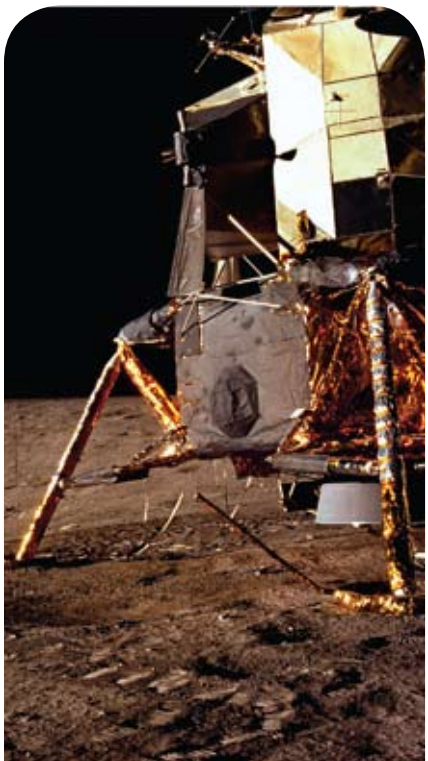
*This three-dimensional map of the Dawes crater on the lunar surface illustrates the type of information that the ILIADS-Questus software product will make available to mission planners and researchers. Darker browns indicate higher elevations in the topography, while the lighter colors signify lower elevations.*

GSFC's IPP Office has been supportive of ILIADS since April 2006, when the ILIADS team was first developing presentations to key decision makers at GSFC and later at NASA Headquarters (HQ). These presentations emphasized how ILIADS could address the data-integration challenges facing lunar exploration missions. IPP's efforts to help the team map out the connections between exploration needs and ILIADS's capabilities paid off, helping to secure internal R&D funding as well as support from Exploration Systems Mission Directorate (ESMD) leaders at HQ.



As work to develop ILIADS progressed with this initial internal funding, the technology was poised to move beyond being an R&D prototype. To truly benefit Constellation missions, ILIADS needed to become a more robust application that could be integrated with commercially developed mission operations tools as well as forthcoming space weather analysis software tools. So GSFC's IPP Office lent its support again, playing a key role in helping win the additional, external funding needed to make this leap.

The ILIADS team had been discussing a possible partnership with United Space Alliance (USA)—whose Questus™ product suite was developed, in part, for use in the management and planning of Space Station crewed operations—when IPP at HQ issued a call for proposals for its inaugural Partnership Seed Fund in August 2006. With assistance of GSFC's IPP Office, the ILIADS team and USA developed a successful proposal for integrating ILIADS with Questus. A second project, which added the Space Radiation and Analysis Group at Johnson Space Center to the team, received a 2007 Seed Fund award that is enabling the development of a software tool to estimate the potential impact of energetic solar particles on future crewed missions.



The collaborative efforts to integrate GSFC's ILIADS software with USA's products are yielding a new decision-making application that NASA can use to plan and carry out future robotic and crewed missions to the Moon. In fact, ILIADS has been selected for several projects, including the Lunar Mapping and Modeling Project (LMMP) and the Lunar Surface Operations Simulator (LSOS) Project. ILIADS's selection for these projects is infusing more than $1 million into GSFC.

"This unique partnership will enable lunar science data to be directly applied to critical ESMD mission planning and operations needs. The integrated software tool suite… is necessary for lunar exploration and currently such an innovative capability does not exist."

*– Carl Walz*
*Director, Advanced Capabilities Division, ESMD*

*Events and critical meetings. Presentation materials. Print and electronic communication vehicles. These are just some of the many areas in which the IPP Office provides strategic support to help GSFC and NASA achieve its multi-faceted goals.*

## Technology-Specific Strategic Support

The IPP Office also makes an effort to support broad categories of technologies at events and through funding opportunities, when possible. Support for GSFC's cutting-edge sensor technologies provides an example for FY08. The IPP Office supported these technologies and those who developed them at Sensors World. Organized by the National Association of Sensor Science and Technology, the event was attended by U.S. and international companies, universities, and research organizations interested in finding new sensor technologies and in partnering with organizations for collaborative R&D. The IPP Office showcased three GSFC sensor technologies through high-impact displays and marketing materials, and also networked with potential licensees. Interest from several companies at the event has resulted in ongoing discussions regarding potential licenses and/or partnerships.

*The IPP Office supported GSFC sensor technologies at Sensors World through displays, marketing materials, and assistance in networking with potential licensees.*

## Strategic Support to Management

To successfully foster innovative, mutually beneficial collaborations that will yield positive impacts for NASA, the U.S. economy, and mankind, the IPP Office has pulled together a team of professionals with a diversity of expertise, capabilities, and skills.

- GSFC's IPP team draws on its technical expertise to understand the challenges that NASA and its potential partners face, identifying where complementary interests and capabilities overlap.
- The team's business acumen allows the IPP Office to recognize strategic factors that may influence decision-making at NASA and its (potential) partner organizations.
- The IPP team appreciates the value of clear communication and has the necessary skills to assure such clarity for all audiences in a print, electronic, and oral media.

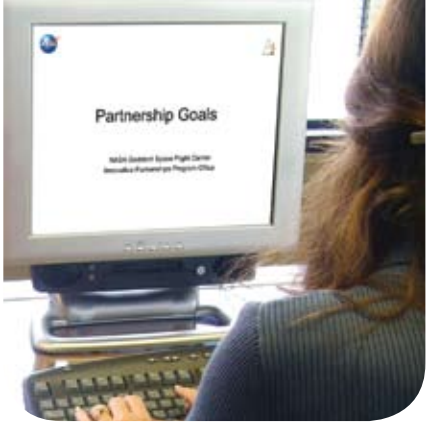
These assets certainly enhance the IPP Office's ability to achieve its goals. Moreover, these capabilities strengthen GSFC as a strategic center. GSFC recognizes the IPP Office as a valuable resource for strategic guidance, demonstrated by the support provided during 2008.

## Communicating Strategic Messages

Throughout 2008, GSFC called on the IPP Office for help in crafting documents, to communicate matters of strategic importance to management at GSFC and at NASA Headquarters. For final reports, slide presentations, speeches at national conferences and more—the IPP team has proven its sophistication in effective strategic communication.

Case in point, when the Applied Engineering and Technology Directorate (AETD) was developing materials to present its "strategic thrusts" to GSFC management, the IPP Office was asked to contribute. Because multiple personnel were responsible for preparing various sections of the presentation, the potential for inconsistent and incomplete information was high. The IPP Office worked with AETD's chief technologist to develop a template that fostered compilation of consistent and comprehensive information. This template focused on encouraging the elements that would be of greatest interest to management. These included a strategic plan that summarized the most advanced technologies being developed at GSFC, a vision for the future in terms of current/potential partners and funding sources, and a technology "roadmap" that indicated when key technologies could be expected to be ready for infusion into a mission.

The end result was a cohesive and relevant message that allowed AETD's chief technologist to speak persuasively and convincingly to GSFC management.




*The IPP Office often provides critical presentation support to GSFC and NASA HQ to help ensure communication consistency and impact.*

## Participating in Key Strategic Meetings

The GSFC Technology Federation meets every week to discuss the center's ongoing work from a strategic, "big picture" perspective. Chaired by the GSFC chief technologist, these gatherings bring together GSFC's various lines of business to ensure awareness of individual team research efforts, key challenges, specific needs for partners and/or funding, and opportunities for new business.

The IPP Office has participated in these Technology Federation meetings, making significant contributions. With its combined insights into GSFC's technology portfolio, NASA mission needs, and industry interest in partnering with NASA, the IPP Office:

- Provides key information about funding opportunities from other government agencies and suggested facilitates partnership development to solve technical challenges
- Notifies GSFC management of outreach opportunities that facilitate interactions with potential partners
- Helps connect GSFC's research to NASA missions, programs, and projects

# Spearheading Funding Efforts for New Innovation

*Two GSFC projects received Supplemental Seed Funding in FY08, bringing the total funded projects this year to seven.*

The IPP Office leads efforts to gain funding for R&D by GSFC innovators and collaboration with external partners. In an effort to continually look beyond the typical large sources of funding, the IPP Office supports small, incremental funding wins in addition to larger funding successes. Many accomplishments in funding gains in FY08 are resulting in increased collaboration and infusion of critical GSFC technologies into NASA missions.

## Supporting Innovators from Small Wins to Big Windfalls

*Dr. Peter Shirron*

### *Case in Point:* Dr. Peter Shirron and GSFC's ADR Technology

An ***adiabatic demagnetization refrigerator (ADR)*** technology, developed at GSFC, has been chosen to be flown on two missions selected by NASA Headquarters as the Agency's next Explorer Program Mission of Opportunity investigations, with funding totaling more than $44 million. This achievement is the result of more than 10 years of work on ADR technology development, and the efforts of the technology development team as well as the IPP Office to find incremental funding sources and partnerships to keep the research active and progressing.

"Only single-stage ADRs have been flown in the past, and for the last 10 years, we've actually been developing a four-stage ADR that runs continuously—a CADR," said Dr. Peter Shirron, who leads the ADR and CADR development efforts for GSFC.

#### *Taking an Innovative Technology into Space*

ADR and CADR technologies provide cryogenic cooling capabilities for space-based applications such as infrared and X-ray detectors that must be cooled close to absolute zero. Built by a team led by Dr. Shirron, a two-stage ADR will be flown on the first mission—the Japan Aerospace Exploration Agency's New Exploration X-Ray Telescope (NeXT), planned for launch in 2013. The ADR unit, along with a liquid helium cooler provided by the Japanese, will provide non-continuous cooling for the mission-critical components on the telescope. The technology will do the same for the second mission, the Spektrum Roentgen Gamma (SRG), to be launched on a Russian rocket to conduct all-sky surveys to identify prime targets for more intensive observations.

And, Dr. Shirron said, the work being funded under these two proposals is opening up R&D doors that may advance ADR and CADR technologies alike for future NASA missions.

### *Patience Pays Off*

"This funding opportunity is a huge breakthrough," said Dr. Shirron. "Over the last 10 years, through the efforts of our research team and the folks in the IPP Office, we've been able to get incremental amounts of funding that have kept our work going and helped us establish a worldwide reputation as the leader in ADR technologies. That is really what has helped us arrive at this success."

Shirron himself has been a great champion of technology transfer and funding acquisition efforts, working closely with the IPP Office to advance cryo-cooling technologies. GSFC's IPP Office provided Dr. Shirron and his team with R&D funding in fiscal years 2001 through 2003, under its Commercial Technology Development (CTD) Program and recently helped him prepare a winning Partnership Seed Fund proposal in 2006, leading to a partnership with Lake Shore Cryotronics and Lockheed Martin. Dr. Shirron leads this ongoing partnership with the goal of increasing the technology readiness level (TRL) of GSFC's CADR technology in preparation for advanced missions such as the International X-Ray Observatory (formerly Constellation-X). And while the two new Explorer Program missions will fly an ADR rather than a CADR, Dr. Shirron said the hardware performance improvements made possible by the Seed Fund are applicable to the ADR technology as well and, therefore, were key to its infusion into these two missions.

> "Over the last 10 years, through the efforts of our research team and the folks in the IPP Office, we've been able to get incremental amounts of funding that have kept our work going and helped us establish a worldwide reputation as the leader in ADR technologies. That is really what has helped us arrive at this success."
>
> *– Dr. Peter Shirron*
> *Innovator,*
> *GSFC*

Recipient of the 2005 James Kerley Award for excellence in technology transfer, Dr. Shirron said that staying in close connection with the IPP Office and playing an active role in these technology transfer efforts have been important factors leading to incremental funding opportunities and partnerships, ultimately leading to ADR's infusion in the two new Exploration Program missions.

"Funding is always a challenge and it often seems like you're getting just enough to stay afloat. But all those small steps along the way are what helped us get a foot through this very large door—to move the last 10 years of work forward," said Dr. Shirron. "Now, we're standing on the edge of exactly what we've been waiting for."

"We're really excited about the TEI funding. We initially received funding from DARPA, and then Goddard's IPP Office encouraged us to apply for HQ's TEI funding. The combined funding will make it possible for us to fly our next AFSS test on a sounding rocket here at Wallops rather than having to piggyback on another mission's schedule to test it out."

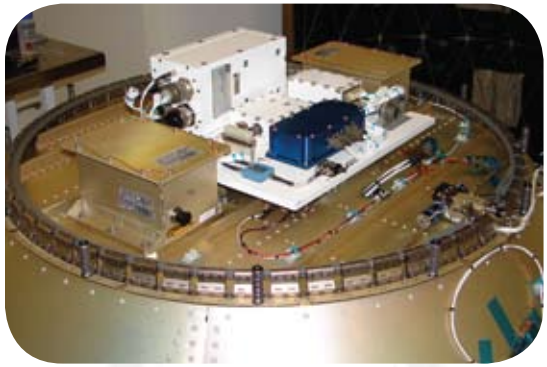
*– Barton Bull*
*Principal Investigator,*
*Wallops Flight Facility*



## *Case in Point:* Barton Bull and GSFC's Autonomous Flight Safety System

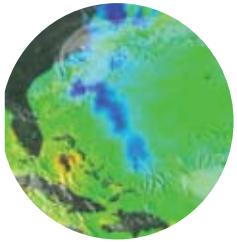
*Barton Bull*

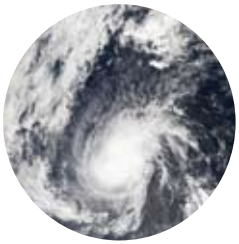
The IPP Office's ongoing support of innovators' funding needs also was demonstrated by a recent collaborative arrangement reached among GSFC, the Air Force, and the U.S. Defense Advanced Research Projects Agency (DARPA). The project will enable GSFC's Wallops Flight Facility and their partners at Kennedy Space Center to hasten the certification process for NASA's ***Autonomous Flight Safety System*** (AFSS). A nontraditional Flight Termination System, AFSS provides trajectory information for flight termination decisions by incorporating rule-based algorithms coded onto redundant flight processors. The system augments or replaces the functions of traditional ground-based tracking and safety systems, and it provides for range safety beyond the radar horizon in the presence of Radio Frequency Interference and in situations requiring minimal response time. The system represents several leaps forward in traditional flight safety, and the effort will enable testing of the merger of AFSS with NASA's Low-Cost TDRSS Transceiver (LCT2), which provides tracking data and other telemetry, including that needed for AFSS verification.



*GSFC's Autonomous Flight Safety System*

Led by Wallops principal investigator, Barton Bull, the AFSS project has been propelled forward in part by funding applications supported by the IPP Office. In 2007, the Office supported Bull's proposal for the IPP Partnership Seed Fund, created by NASA Headquarters to initiate cost-shared "bridge funding" that enables large partnerships and development efforts. While the proposal was not accepted for funding at that time, it did create momentum and internal support from the project—leading to a significant win of Supplemental Seed Funding in FY08, as well as funding for NASA Headquarter's (HQ) Office of the Chief Engineer's Technical Excellence Initiative (TEI), which provides funding for research and development projects that offer solutions to technical challenges affecting multiple NASA Mission Directorates.





Bull said the funding efforts are helping his project conduct more science in a shorter timeframe, ultimately benefiting NASA missions. "We're really excited about the TEI funding. We initially received funding from DARPA for the initiative, and then GSFC's IPP Office also encouraged us to apply for HQ's TEI funding," said Bull. "The combined funding will make it possible for us to fly our next AFSS test on a sounding rocket here at Wallops rather than having to piggyback on another mission's schedule to test it out."

### *Other Projects Win TEI and Supplemental Seed Funding*

Other GSFC projects also are being supported through TEI and supplemental support from HQ's Partnership Seed Fund. Principal investigators Michael Hesse and Marlo Maddox received TEI funding in FY08 to develop an ***Integrated Space Weather Analysis System*** to help better understand and predict space weather conditions as they relate to NASA mission operations. The proposed turnkey, Web-based dissemination system for NASA-relevant space weather information will combine forecasts based on the most advanced space weather models with concurrent space environment information.

While NASA HQ did not issue a Seed Fund call in FY08, GSFC innovators did receive supplemental Seed Fund support this year, bringing the total GSFC Seed Funded projects being supported this year to seven (five were awarded Seed Funding in FY07).

In addition to the AFSS project mentioned above, GSFC innovator Cathy Long received supplemental Seed Fund support for GSFC's ***Advanced Microwave System Architecture*** (AMSA) Demo, through an SAA with Northrop Grumman. The goal of the funded research is to collect scientific data that will validate the technology employed in newly developed radar systems. In the long term, the research team plans to develop an efficient and effective microwave development program to meet NASA's science and exploration goals. "We are very pleased that Goddard projects have received even more Seed Funding for 2008," said Nona Cheeks, Chief of GSFC's IPP Office. "It's clear evidence of the wealth of innovative work happening here at Goddard."

## How the IPP Supports GSFC's Funding Efforts

- Identifying sources of partnership funding
- Streamlining online funding application processes
- Minimizing application efforts for principal investigators
- Providing technical editing support throughout funding application processes
- Helping PIs strategically develop more winnable proposals
- Publicizing funding successes to attract additional partnerships

*The IPP Office's efforts in FY08 helped secure more than $8.5 million in internal and external financial and in-kind support for 11 GSFC projects.*

## New Source: The Innovation Fund

In FY08, the IPP Office established a new source of support—The Innovation Fund. As another effort to look beyond the typical sources of funding available for GSFC R&D efforts, the Innovation Fund provides an opportunity for GSFC technologists to foster truly innovative ideas that currently fall in a funding gap but are essential for future NASA missions. Facilitating innovation through collaboration, the Fund aims to benefit NASA missions by funding projects that may be higher risk but also higher reward. Eligible projects:

- Have potential to establish GSFC as a leading provider of technology to commercial markets
- Employ GSFC labor for participation in novel, cutting edge projects with partners
- Are engaged in technology development that is complementary to GSFC's strategic direction
- Foster partnerships with world-class partners
- Feature regional partners that can benefit from the economic boost of partnership funding

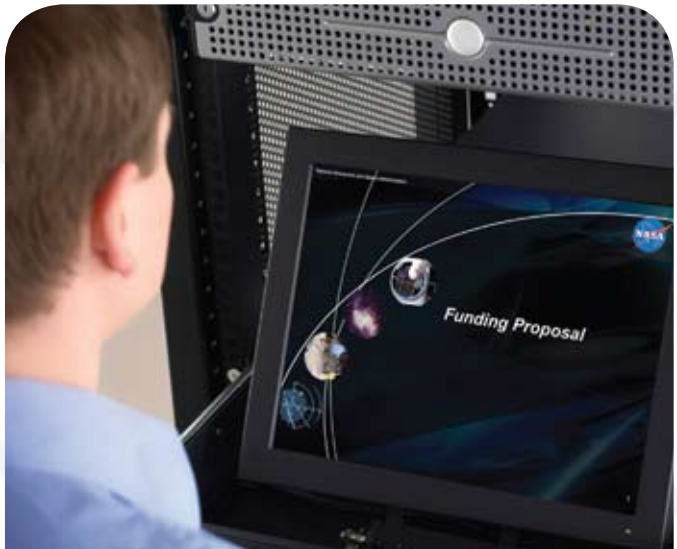

*The IPP Office maintains a Web page of federal funding solicitations, enabling innovators to find other sources of incremental funding.*

## Securing Funding for GSFC

Early in FY08, the IPP Office was asked to manage GSFC's process for responding to the Office of the Chief Engineer's Technical Excellence Initiative (TEI). Although the TEI call did not require a partnership component, the IPP Office was the natural choice for leading the center's proposal efforts.

In 2007 and 2008, IPP Office successfully developed and managed an efficient and effective proposal management process for GSFC's submissions to the Partnership Seed Fund. These efforts helped to secure more than $8.5 million in internal and external financial and in-kind support for 11 GSFC projects. The IPP Office's proposal process for the Seed Fund involved a first-round review of dozens of notices of intent, which were down-selected to a few projects to develop into full proposals. The IPP Office also supported proposal development, including creation of a template that ensured every proposal included the required information in an easy-to-read format.

This approach, which had proved so successful for the Seed Fund, was essentially repeated to respond to the TEI call. Three GSFC proposals were submitted, and two were selected for funding totaling more than $1 million, dramatically illustrating the value of the IPP Office's strategic support.




*The IPP Office provides valuable editorial and strategic support in helping innovators prepare winning proposals.*

"I'd like to express my sincere thanks and appreciation [to the IPP Office] for your outstanding support throughout the latest IPP Seed Fund proposal preparation process. Your comments, feedback, suggested edits, etc. were highly valued and, in my opinion, significantly contributed to a terrific proposal."

*— Stephen Talabac*
*Lead Technologist for Sensor Web Systems, GSFC*

# Supporting Business Growth for Mutual Benefits

The Small Business Innovative Research and Small Business Technology Transfer (SBIR/STTR) programs are administered by the IPP Office and offer another way for GSFC to develop technologies that answer NASA mission needs while supporting the growth of small businesses and the U.S. economy.

*Jim Chern leads the SBIR/STTR programs for GSFC's IPP Office.*

## Advanced Collimator Technology for NASA Imaging Finds Application in Security and Medical Screenings

Mikro Systems of Charlottesville, Virginia has successfully completed Phase 2 efforts to advance high-resolution, high-aspect-ratio X-ray/gamma ray collimator fabrication by reducing slit pitch by a factor of about two—from 35 microns to 20 microns—using an innovative hybrid micro-machining technology. The advancements reduce the size and mass of the enabling materials for astrophysical imaging missions, creating the potential to significantly contribute to NASA's ongoing instrumentation development. The company has essentially reduced the collimator from the size of a coffee table to that of a shoebox. Under the Phase 3 contract, Mikro Systems is currently preparing the collimator to be recommended for several possible NASA missions (e.g., Solar Orbiter Mission). In addition, commercial possibilities for the company include:

- A beta production contract worth $900,000 with a company that provides airport luggage screening equipment, potentially renewable for $3.5 million in 2009.
- A $200,000 contract to provide the technology to CT scanning manufacturers, renewable for $600,000 in 2009.

## From Earth Science Data Storage to Commercial Success

Developed under a Phase 2 SBIR contract, Extrieva—an Earth science data archival system by Archivas of Waltham, Massachusetts—offers a low-cost, scalable storage management system that embraces several National Research Council (NRC) technology recommendations. In particular, Extrieva is a disk-based solution determined by NRC to be competitive with tape systems for long-term, archival-class storage. The system addresses NASA mission needs, such as the Earth Observing System Data and Information System (EOSDIS) and its diverse global user base. Archivas was purchased by Hitachi in 2007, and the new company began marketing the storage system as the Hitachi Content Archive Platform. Under successful Phase 3 commercialization activities, Hitachi has sold the product to GSFC, National Archivas (Bush Administration Archives), several military locations, Google (for e-mail archives), Wal-Mart, Target, and United Airlines.

"The SBIR program has helped us refine and optimize our technology without having to go to the private investment market and give up equity in our company."

*— Michael Appleby*
*President and CEO,*
*Mikro Systems*



## Designing a Sensor to Better Understand Cloud Characteristics

Through a Phase 2 SBIR contract, researchers at Stratton Park Engineering Company (SPEC) of Boulder, Colorado, have developed prototypes of miniaturized cloud sensors for use on small, unmanned aerial systems and balloons at Wallops Flight Facility. Pending testing of the sensors, SPEC expects the technology will provide critical in situ cloud data that will help environmental scientists better understand the impact that clouds have on climate. The in situ cloud data can be compared with data from ground-based and satellite-borne remote sensors, thereby improving the retrievals that the remote sensors use to characterize clouds. Improving satellite retrievals of cloud properties is critical for refining and validating numerical models that predict global climate change.

*In FY08, several companies have reached Phase 2 or Phase 3 SBIR/ STTR contracts, with technologies being prepped for infusion in NASA missions and/or commercial successes.*



## Advancing Our Understanding of Clouds and the Carbon Cycle

Two NASA-funded SBIR contracts with Anasphere of Bozeman, Montana may enable researchers to better understand the water content of clouds and the carbon dioxide in Earth's atmosphere—helping to meet NASA mission needs while supporting this new business. One of the Phase 2 contracts has resulted in a set of miniaturized cloud-water sensors for test flights on balloons from Wallops Flight Facility, helping scientists determine how the sensor performs for measuring the water content in clouds and potentially the distribution of rain in a storm. The other SBIR Phase 2 contract is enabling Anasphere to develop a miniaturized carbon dioxide ($CO_2$) sensor for use on unmanned missions. If validation is favorable, NASA and Anasphere expect the sensor to be revolutionary, enabling highly sensitive measurements of $CO_2$ sources and sinks in the atmosphere, and thereby providing a deeper understanding of the carbon cycle and climate change.

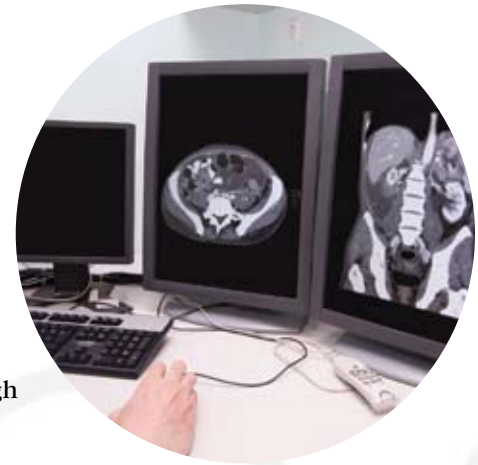
## Small Business Contributes to Next-Generation NASA Lidar Systems

A Phase 2 SBIR contract with AdvR, Inc. of Bozeman, Montana has resulted in a prototype of a non-mechanical fiber optic switch for use with high-power lasers. Designed to rapidly switch fiber-coupled lasers with 10 output channels, the device serves as an integral part of a fiber-based, fixed-array laser transmitter for next-generation NASA lidar systems. The design provides several important features that are required yet not currently available in a fiber switch, necessary to achieve a fiber-arrayed lidar source that includes high optical power handling, reduced crosstalk, low optical loss, fast switching times, low power consumption, and robust construction in a monolithic package with no moving parts. The company is now engaged in a Phase 3 contract worth $190,000, targeting further improvement in the device's switching power and speed.

## High-Performance Data Analysis Tools for Sun-Earth Connection Missions

Tech-X Corporation of Boulder, Colorado has recently completed an SBIR Phase 2 contract for high-performance data analysis tools that are used with ITT Visual Information Solutions Interactive Data Language software. Scientists working on GSFC's Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) mission—which has had an X-ray imaging satellite in space to study the sun since 2002—are beginning to use Tech-X's parallel computing tools to process large quantities of visual data 10 to 40 times faster then they could do previously.

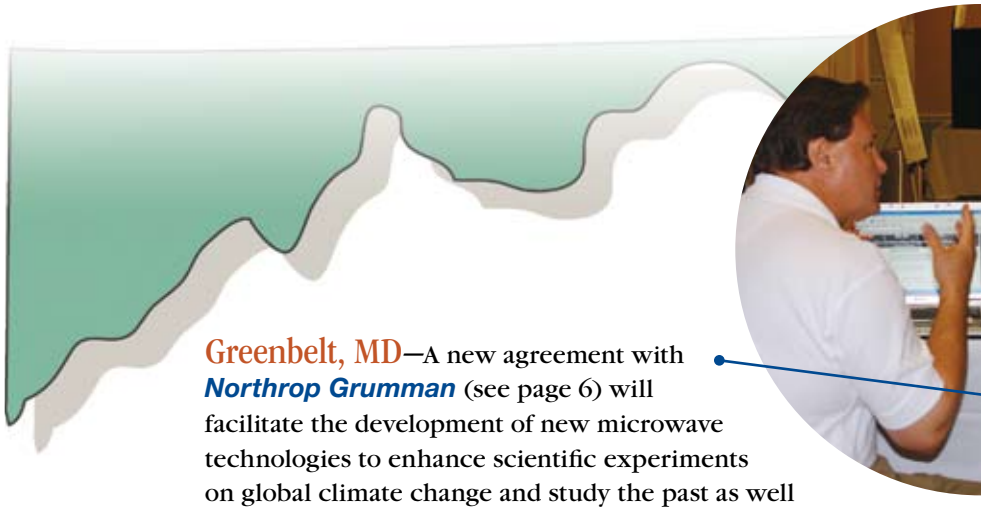
Commercialization activities in Phase 3 include a license purchased by NASA Jet Propulsion Lab. Tech-X has sold licenses for its technology since 2007, to 25 astrophysics and medical imaging research customers, and the company credits the SBIR program with enabling them to be competitive. "The SBIR program allows us to be very innovative," said John Cary, the company's CEO. "With other programs, it is hard to compete against big companies and universities. The SBIR program is oriented to companies who can come up with new ideas and [execute] quickly." As a result of its innovation through the SBIR program, this small firm earned $50,000 in 2007 revenue and $11,000 through April 2008.



> "Most of our business comes from these types of contracts. It's how we've grown so far."
>
> *— Tony Roberts*
> *Senior Laser Physicist,*
> *AdvR, Inc.*

# Thinking Globally, Innovating Locally

The IPP Office is expanding its reach around the globe—through innovative efforts at home. In the Maryland/D.C. area, GSFC's IPP hosts events to showcase GSFC technologies and provide a springboard for collaboration with organizations locally, nationally, and internationally. Some of GSFC's key agreements are with Maryland-based partner companies—helping to strengthen relationships at home, build the local economy, and promote cost efficiency at a time when no taxpayer dollar is taken for granted.



Greenbelt, MD—A new agreement with ***Northrop Grumman*** (see page 6) will facilitate the development of new microwave technologies to enhance scientific experiments on global climate change and study the past as well as future habitability of planets such as Mars.

Greenbelt, MD—Sponsored by the American Astronautical Society, the ***Goddard Memorial Symposium*** was attended by IPP Office staff, enabling identification of new partnering opportunities and strategies.

Laurel, MD—GSFC co-sponsored the first ***Composite Material Engineering Technology (COMET) for Spacecraft Applications Workshop,*** bringing together leading experts in the use of composites materials in aerospace applications, for presentations and discussion about state-of-the-art technological advances. The IPP Office presented its services, highlighting the capabilities of GSFC's composites branch and encouraging potential partners to begin discussions with the Office. As a direct result of the workshop, the GSFC's composites group submitted and received approval for a collaborative project with the Air Force Research Laboratory and The Aerospace Corporation.

College Park, MD—Entrepreneurs and business executives learned how they can capitalize on cutting-edge composites and materials manufacturing technologies developed by GSFC and NASA Langley Research Center (LaRC) at an event sponsored by the ***Maryland Technology Development Corporation*** (TEDCO) and the ***Tech Council of Maryland/ MdBio*** (TCM/MdBio). This event highlighted more than a dozen technologies available for licensing and/or commercialization.

*Technology Transfer Manager Ted Mecum (left) talks with an attendee at TEDCO 2008.*

*Greenbelt, MD*

*Laurel, MD*

*Lanham, MD*

*College Park, MD*

*Bethesda, MD*

*Annapolis, MD*


*Maryland Space Day*

*A large audience gathered to hear presentations at TEDCO about more than a dozen technologies available for licensing or commercialization.*

**Annapolis, MD**—Legislators, members of State departments, media, school groups, and business representatives were among the attendees of ***Maryland Space Day***, sponsored by GSFC's Government and Community Relations Office and supported by the IPP Office. Attendees learned how GSFC technologies and missions benefit Maryland and its economy.

**Bethesda, MD**—A partnership with ***Iridium Satellite Corporation*** (see page 8) will enable NASA to influence the company's next-generation constellation satellite program (NEXT) system capabilities, to meet critical mission needs.

**Lanham, MD**—A new agreement with ***Genesis Engineering Solutions, Inc.*** is answering NASA mission needs by helping NASA researchers address contamination issues critical to the success of its advanced optics instruments.

**Lanham, MD**—A new partnership with ***a.i. Solutions*** (see page 9) is aiding cost reduction for ground-based aerospace mission operations.

"The IPP office team contributed greatly to the successful CoMET for Space Applications Workshop. Thanks to you and your team for making this a first class event."

*— Kenny Segal*
*GoCOMET Team Leader,*
*Goddard Composite Material Engineering*

"The work of the Innovative Partnerships Program at GSFC helps transfer technologies out of the space program into businesses in Maryland and across the U.S., finding new uses for the technologies here on Earth—and benefiting their business and the state economies as a whole. We also look to a growing number of technology-based organizations within the state to form partnerships that will help meet NASA needs. Working synergistically with businesses in the state of Maryland is a win-win opportunity."


*— Nona Cheeks*
*Chief,*
*GSFC's IPP Office*

# Embracing New Ways of Managing Technology

*The IPP Office supported 43 patent applications for GSFC technologies in FY08.*

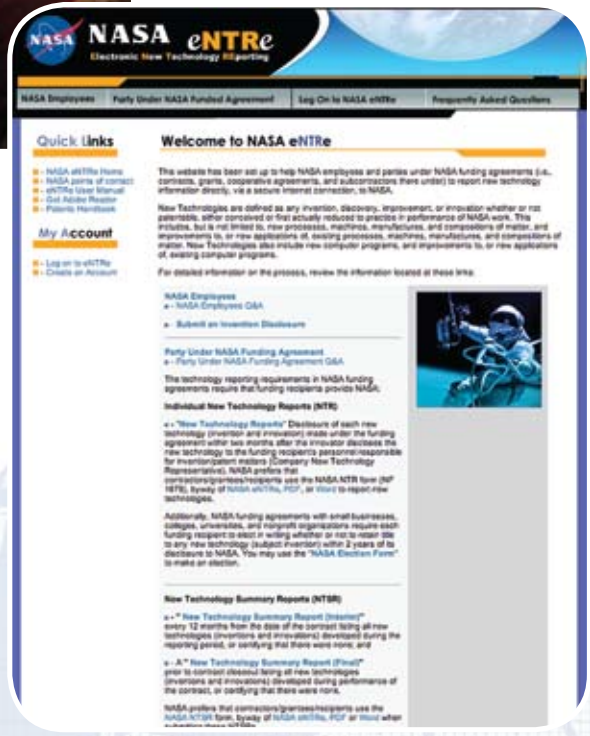
The IPP Office is continually refining its best management practices for intellectual property (IP), helping to protect and enhance the value of GSFC technologies within and beyond NASA. FY08 saw the introduction of new training sessions and efforts to increase new technology reporting, along with increases in awards and admirable gains in IP protection.

*Technology transfer training courses get innovators and management up to speed on IP protection, new technology reporting, partnerships, and more.*

## IPP Staff Encourages New Technology Reporting

Continuing its FY07 push for increased new technology reporting, the IPP Office continued a door-to-door approach, providing ***in-person guidance*** and encouragement to help innovators understand the value of technology reporting and answer questions about the process. The Office has continued to offer innovators:

- Quarterly ***technology transfer training***, covering the ins and outs of IP protection, partnerships, filing NTRs, and more
- ***Special courses*** covering the unique software reporting process
- ***Division-level, hands-on courses*** when requested by Division management
- ***Special announcements*** about training and new technology reporting in publications and on-site displays




## A Steady Increase in ICB Awards

GSFC received 242 Inventions and Contributions Board (ICB) Awards in FY08, more than double the amount received in FY07. The IPP Office files applications for ICB Awards on behalf of innovators, who receive monetary recognition for technologies with high potential for commercialization or infusion in NASA missions. This increase demonstrates GSFC's commitment to new technology reporting and to adding valuable technologies to the NASA portfolio.

*GSFC innovators reported a total of 220 new technologies in FY08. Using eNTRe to report technologies streamlines the process, lowers costs, and helps improve staff efficiency.*

# Recognizing Award-Winning Innovation

*The IPP Office supported three award-winning applications for GSFC technologies or staff in FY08.*

High-profile award wins help GSFC gain recognition and prestige for its technologies and technical services. The IPP Office helps support innovators in writing and putting together comprehensive award application packages. And when GSFC technologies or innovators win awards, the IPP Office publicizes this success in press releases, magazines, and other publications—helping to expand GSFC's reputation as a leader in establishing the state of the art. FY08 witnessed several awards for which GSFC is deservedly proud.

## Sensor Web 2.0 Claims GSFC's Third Consecutive R&D 100 Award

GSFC racked up a triple-play with the announcement that its Sensor Web 2.0 won an R&D 100 Award in FY08. This marks the third consecutive year that GSFC technology has been lauded at the ceremony that the *Chicago Tribune* dubbed the "Oscars of Invention." Each year, *R&D Magazine* selects 100 of the most innovative technologies that have the potential to further scientific discovery, and to greatly affect human life and the way we live.

GSFC's IPP Office supported the award win through a month-long collaboration with Dan Mandl, the innovation team leader, to develop a compelling and comprehensive award application. "The IPP Office initiated, facilitated and provided the necessary support to create an award application that was concise, compelling, and ultimately provided a prestigious R&D 100 award. This award helps us establish and maintain Goddard's reputation as an agency where highly innovative work is happening, and could not have been accomplished without the IPP Office's excellent support and leadership." said Mandl.

*The Federal Laboratory Consortium Mid-Atlantic Region named Technology Transfer Manager Ted Mecum a recipient of a 2008 Partnership Award for his innovative strategy to increase use of and knowledge about GSFC's SpaceWire Link and Switch ("router") technology throughout the international aerospace industry.*

*GSFC Innovator Glenn Rakow also received an honorable mention from FLC-MAR in FY08 for his pioneering work on GSFC's SpaceWire router technology.*

*IPP Office Chief Nona Cheeks and GSFC Innovator Donya Douglas were recognized as 2008 Women of Color All-Stars and Rising Stars of Technology by the National Women of Color (WOC) Science, Technology, Engineering and Math (STEM).*

*Left to right: Pat Cappelaere, Stu Frye, and Dan Mandl lead the innovator team for the award-winning Sensor Web 2.0.*

> "The IPP Office initiated, facilitated and provided the necessary support to create an award application that was concise, compelling, and ultimately provided a prestigious R&D 100 award. This award helps us establish and maintain Goddard's reputation as an agency where highly innovative work is happening, and could not have been accomplished without the IPP Office's excellent support and leadership."
>
> *— Dan Mandl*
> *Sensor Web 2.0 Team Lead, GSFC*



The award win brought even more prestige to GSFC's Sensor Web 2.0, which previously had gained attention in a wildfire management campaign in California. Particularly user friendly and cost effective, Sensor Web 2.0 frees up highly skilled programmers and engineers to attend to more technically demanding tasks, resulting in a more efficient allocation of resources.

A Web services–based software, Sensor Web 2.0 gathers and assimilates data from a network of sensors—seismic and GPS ground sensors, firetower sensors, weather radar devices, and satellite sensors—enabling them to operate as a cohesive whole. By employing Workflow Management Coalition (WfMC) workflows and taking advantage of emerging "mashup" capabilities, Sensor Web 2.0 enables users to set up such sensor networks via easy point-and-click interfaces. Because the sensor integration path is not tied to a particular system, it strengthens the U.S. contribution to GEOSS, the Global Earth Observing System of Systems that unites 60 countries in a joint network of Earth-observing systems. The result is a complete, real-time picture of Earth via shared global resources.

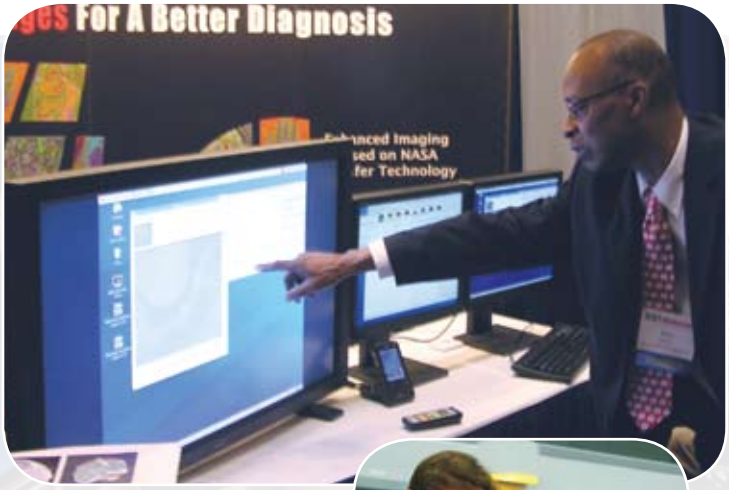
Dan Mandl, the innovation team leader, noted that while all sensor web initiatives work toward early detection of natural disasters, Sensor Web 2.0 has the advantages of being particularly user friendly and cost effective. "Scientists or emergency workers typically spent months or years working with a team of programmers to assemble sensors and data processing algorithms into workflows to accomplish an application," Mandl said. "Sensor Web 2.0 enables even students to assemble customized sensor web applications in a matter of hours or sometimes minutes, with no extra staff resources. Like the Internet, usability will increase exponentially as the library of available workflows grows."

# Expanding Our Reach through Creative Networking

*IPP Office staff and GSFC innovators gained numerous contacts and networked with many potential partners at events throughout FY08.*

Attendance at local, national, and international events is a key part of the IPP Office's strategy to extend its reach beyond its usual targets. IPP Office staff and GSFC innovators attended many events in FY08, providing opportunities to:

- Identify new partnership prospects
- Network with other technology transfer professionals about best practices
- Highlight NASA mission needs to identify technology infusion possibilities
- Extend the reach and reputation of GSFC technologies and technologists




## FY08 Events

- Maryland Space Day (see more information on page 6)
- ESMD Technology Exchange Workshop
- MIT Enterprise Forum
- LES Annual Meeting
- FLC-MAR Annual Meeting
- Reach to Space Conference
- Missouri Regional SBIR Conference
- AUTM Annual Meeting
- Annual TEDCO Conference (see more information on page 26)
- SED Poster Session
- Boston Future Forum
- MAPLD Meeting
- IRAD Poster Session
- NCSL Meeting
- National Nano Engineering Conference
- SAMPE Conference
- Goddard Memorial Symposium (see more information on page 26)
- Smithsonian Air and Space Museum Celebrate Goddard Day
- MODSIM Conference
- Goddard Launch Festival



"It is very important for Goddard to have a consistent presence among the local, national, and international aeronautics communities. This is part of our continuing efforts, starting in FY07, to make Goddard the Technology Partner of Choice through recognition of our world-class capabilities."

*— Nona Cheeks*
*Chief,*
*GSFC's IPP Office*

# Communicating to Expand Relationships

The IPP Office also works to expand relationships through mass communications efforts with internal NASA publications, as well as with the trade press and mainstream media. These efforts help promote GSFC technologies within NASA and to the aerospace, commercial, and academic sectors.


Goddard Tech Transfer News, *the IPP Office's quarterly magazine, showcases notable innovators, new technologies, awards, events, and partnership successes.*

## Presence in a Growing Number of Publications

The IPP Office provides writing support to ensure prominent promotion of GSFC technologies in several journals, magazines, and other publications, including:

- *Goddard View*
- *FLC's Innovation*
- *NASA Tech Briefs*
- *Spinoff 2008*




## Press Prowess

The IPP Office, together with the Public Affairs Office, supported press releases in 2008 for key agreements with Northrop Grumman and Ocean Tomo. As a result, stories about these partnerships appeared in:

- *The Wall Street Journal*
- *Reuters*
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# The IPP Office and You: The Most Innovative Partnership of All

The IPP Office works to establish innovative partnerships for technology transfer and infusion with NASA, industry, and academia, but we cannot do it without you—GSFC innovators, program and project managers, and our valuable contacts outside NASA.

The IPP Office is here to serve you. We hope you will contact us to learn more.

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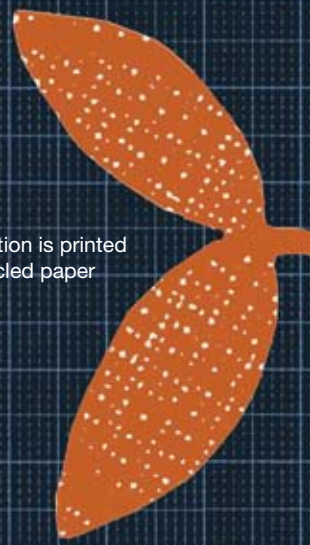

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